Docket No.: 21-006 ***PATENT***

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Clifford Brown et al.	:	Confirmation No.:	3876
Serial No.:	09/722,168	:	Art Unit:	2611
Filed:	11/22/2000	:	Examiner:	Kevin Kim
For:	SYSTEM AND METHOD FOR AUTOMATIC DIAGNOSIS OF IMPAIRMENTS IN A DIGITAL QUADRATURE AMPLITUDE MODULATED SIGNAL	:		

Mail Stop Appeal Brief - Patents
Commissioner for Patents
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APPEAL BRIEF

Sir/Madam:

The following Appeal Brief is submitted pursuant to the Notice of Appeal filed December 28, 2007, in the above-identified Application.

TABLE OF CONTENTS

(1) Real party in interest

The real party in interest is Sunrise Telecom Incorporated, having its principal place of business in San Jose, California

(2) Related appeals and interferences

There are no known related appeal or interference cases.

(3) Status of claims

Claims 1, 3-14, 18, 40, 54, 56-62, and 70 stand under final rejection, from which rejection this Appeal is taken.

Claims 17, 19, 33-53, and 73-80 are allowed.

Claims 3, 5-13, 40, 56-61 are objected to as being dependent upon rejected base claims, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

(4) Status of amendments

No amendments have been filed subsequent to the final rejection of October 30, 2007.

(5) Summary of claimed subject matter

The following concise explanation of the invention by numbering and insertion of reference pages (p.) and line numbers (l.) is intended to be exemplary and not limiting.

1. A device for detecting impairments in a digital quadrature amplitude modulated signal comprising:

a phase noise detector [700] [p. 10, l. 1-2] comprising;

a sorter [800] [p. 10, l. 3-8];

a rotator [804] [p. 10, l. 9, thru p. 10, l. 8] coupled to the sorter [800] [p. 10, l. 3-8]; and

a comparator [802] [p. 11, l. 9-24] coupled to the rotator [804] [p. 10, l. 9, thru p. 10, l. 8];

a compression detector [702] [p. 25, l. 25, thru p. 26, l. 2];

an interference detector [704] [p. 13, l. 22-26]; and

a constellation storage [706] [p. 9, l. 15-20] coupled to the phase noise detector [700] [p. 10, l. 1-2], the compression detector [702] [p. 25, l. 25, thru p. 26, l. 2], and the interference detector [704] [p. 13, l. 22-26].

2. (canceled)

3. The device of Claim 1 wherein the rotator [804] [p. 10, l. 9, thru p. 10, l. 8] rotates a vector utilizing a method comprising the steps of:

converting the vector's end point coordinates into polar coordinates [p. 10, l. 21-22];

adjusting the angle coordinate [p. 10, l. 21-22]; and

reconverting the end point coordinates to Cartesian coordinates [p. 10, l. 21-22].

4. The device of Claim 1 wherein the rotator [804] [p. 10, l. 9, thru p. 10, l. 8] rotates a vector utilizing the matrix [p. 10, l. 26-27]:

$$\begin{vmatrix} \cos\Theta & \sin\Theta \\ -\sin\Theta & \cos\Theta \end{vmatrix}$$

5. The device of Claim 1 wherein the comparator [802] [p. 11, l. 9-24] evaluates the inequality [p. 11, l. 15-20]:

$$\sigma_X >=_{[57]} C\sigma_y$$

6. The device of Claim 5 wherein C = 1.5 [p. 11, l. 20].

7. The device of Claim 1 wherein the compression detector [702] [p. 25, l. 25, thru p. 26, l. 2] comprises:

a sorter [800] [p. 10, l. 3-8]; and

an X/Y deviation determinator [902] [p. 12, l. 10-27] coupled to the sorter [800] [p. 10, l. 3-8].

8. The device of Claim 1:

wherein the phase noise detector [700] [p. 10, l. 1-2] comprises:

a rotator [804] [p. 10, l. 9, thru p. 10, l. 8]; and

a comparator [802] [p. 11, l. 9-24] coupled to the rotator [804] [p. 10, l. 9, thru p. 10, l. 8];

wherein the compression detector [702] [p. 25, l. 25, thru p. 26, l. 2] comprises an X/Y deviation determinator [902] [p. 12, l. 10-27]; and

wherein the phase noise detector [700] [p. 10, l. 1-2] and compression detector [702] [p. 25, l. 25, thru p. 26, l. 2] share a sorter [800] [p. 10, l. 3-8] coupled to the rotator [804] [p. 10, l. 9, thru p. 10, l. 8] and to the X/Y deviation determinator [902] [p. 12, l. 10-27].

9. The device of Claim 7 wherein the X/Y deviation determinator [902] [p. 12, l. 10-27] evaluates the inequality [p. 12, l. 19-23]:

$$Zavg <= CZ_{exp}$$

10. The device of Claim 9 wherein C = 0.98 [902] [p. 12, l. 22-23].

11. The device of Claim 7 wherein the X/Y deviation determinator [902] [p. 12, l. 10-27] analyzes a top row of cells of a constellation.

12. The device of Claim 11 wherein the X/Y deviation determinator [902] [p. 12, l. 10-27] evaluates the inequalities [p. 13, l. 5-16]:

$$Y_{avg}[b_4] < Y_{avg}[b_3] < Y_{avg}[b_2] < Y_{avg}[b_1]$$

and

$$Y_{avg}[b_{-4}] < Y_{avg}[b_{-3}] < Y_{avg}[b_{-2}] < Y_{avg}[b_{-1}]$$

13. The device of Claim 7 wherein the X/Y deviation determinator [902] [p. 12, l. 10-27] analyzes a column of cells of a constellation.

14. The device of Claim 1 wherein the interference detector [704] [p. 13, l. 22-26] comprises:

a sorter [1000] [p. 14, l. 1-7];

an error calculator [1002] [p. 13, l. 22, thru p. 14, l. 12] coupled to the sorter [1000] [p. 14, l. 1-7];

a distribution chart [1004] [p. 13, l. 22-26, and p. 14, l. 12-17] coupled to the error calculator [1002] [p. 13, l. 22, thru p. 14, l. 12]; and

a data peak detector [1006] [p. 13, l. 22-26, and p. 14, l. 18, thru p. 15, l. 17] coupled to the distribution chart [1004] [p. 13, l. 22-26, and p. 14, l. 12-17].

Claims 15-16 (canceled)

17. A device for detecting impairments in a digital quadrature amplitude modulated signal comprising a phase noise detector [700] [p. 10, l. 1-2], wherein the phase noise detector [700] [p. 10, l. 1-2] comprises:

a sorter [800] [p. 10, l. 3-8];

a rotator [804] [p. 10, l. 9, thru p. 10, l. 8] coupled to the sorter [800] [p. 10, l. 3-8] wherein the rotator [804] [p. 10, l. 9, thru p. 10, l. 8] rotates a vector by utilizing a method comprising the steps of:

converting the end point coordinates into polar coordinates [p. 10, l. 21-22];

adjusting the angle coordinate [p. 10, l. 21-22]; and

reconverting the end point coordinates to Cartesian coordinates [p. 10, l. 21-22]; and

a comparator [802] [p. 11, l. 9-24] coupled to the rotator [804] [p. 10, l. 9, thru p. 10, l. 8]

18. A device for detecting impairments in a digital quadrature amplitude modulated signal comprising a phase noise detector [700] [p. 10, l. 1-2], wherein the phase noise detector [700] [p. 10, l. 1-2] comprises:

a sorter [800] [p. 10, l. 3-8];

a rotator [804] [p. 10, l. 9, thru p. 10, l. 8] coupled to the sorter [800] [p. 10, l. 3-8]; and

a comparator [802] [p. 11, l. 9-24] coupled to the rotator [804] [p. 10, l. 9, thru p. 10, l. 8] wherein the rotator [804] [p. 10, l. 9, thru p. 10, l. 8] rotates a vector utilizing the matrix:

$$\begin{vmatrix} \cos\Theta & \sin\Theta \\ -\sin\Theta & \cos\Theta \end{vmatrix}$$

19. A device for detecting impairments in a digital quadrature amplitude modulated signal comprising a phase noise detector [700] [p. 10, l. 1-2]:

wherein the phase noise detector [700] [p. 10, l. 1-2] comprises:

a rotator [804] [p. 10, l. 9, thru p. 10, l. 8]; and

a comparator [802] [p. 11, l. 9-24] coupled to the rotator [804] [p. 10, l. 9, thru p. 10, l. 8];

wherein the compression detector [702] [p. 25, l. 25, thru p. 26, l. 2] comprises an X/Y deviation determinator [902] [p. 12, l. 10-27];

wherein the interference detector [704] [p. 13, l. 22-26] comprises:

an error calculator [1002] [p. 13, l. 22, thru p. 14, l. 12];

a distribution chart [1004] [p. 13, l. 22-26, and p. 14, l. 12-17];

a data peak detector [1006] [p. 13, l. 22-26, and p. 14, l. 18, thru p. 15, l. 17]; and

wherein the phase noise detector [700] [p. 10, l. 1-2], compression detector [702] [p. 25, l. 25, thru p. 26, l. 2], and interference detector [704] [p. 13, l. 22-26] share a sorter [800] [p. 10, l. 3-8] coupled to the rotator [804] [p. 10, l. 9, thru p. 10, l. 8], to the X/Y deviation determinator [902] [p. 12, l. 10-27], and to the error calculator [1002] [p. 13, l. 22, thru p. 14, l. 12].

Claims 20-32. (canceled)

33. A method for detecting compression in a digital quadrature amplitude modulated signal, the method comprising the steps of:

sorting the symbols of the digital quadrature amplitude modulated signal into a constellation [p. 9, l. 16-20; p. 10, l. 3-8];

selecting a sub-group of data points from the constellation [p. 10, l. 9-11];

determining the magnitude of the vectors from the origin of the constellation to each datum point of the sub-group [p. 10, l. 11-12];

determining the magnitude of a vector from the origin to an ideal point associated with the sub-group [p. 10. l. 13-14];

comparing the magnitude of the vectors from the origin of the constellation to each datum point to the magnitude of the vector from the origin to the ideal point associated with the sub-group [p. 11, l. 2-24];

determining from the comparison if compression is present [p. 12, l. 3-23]; and

generating a signal indicating compression in the digital quadrature amplitude modulated signal if the determining step indicates compression is present [p. 12, l. 24-27].

34. The method of Claim 33 wherein the sub-group is a cell of the constellation [p. 12, l. 3-23].

35. The method of Claim 33 wherein the sub-group is a cell in a corner of the constellation [p. 12, l. 3-23].

36. The method of Claim 33 further comprising the step of averaging the magnitudes of the vectors from the origin of the constellation to each datum point of the sub-group [p. 12, l. 10-18].

37. The method of Claim 34 further comprising the step of averaging the magnitudes of the vectors from the origin of the constellation to each datum point of the sub-group [p. 12, l. 10-18].

38. The method of Claim 35 further comprising the step of averaging the magnitudes of the vectors from the origin of the constellation to each datum point of the sub-group [p. 12, l. 10-18].

39. The method of Claim 36 wherein the comparing step evaluates the inequality [p. 12, l. 19-23]:

$Zavg <= CZ_{exp}$

40. The method of Claim 39 wherein C = 0.98 [p. 12, l. 22-23].

41. A method for detecting compression in a digital quadrature amplitude modulated signal, the method comprising the steps of:

sorting the symbols of the digital quadrature amplitude modulated signal into a constellation [p. 9, l. 16-20; p. 10, l. 3-8];

selecting more than one sub-group of data points from the constellation [p. 12, l. 3-9];

analyzing each datum point according to its selected sub-group [p. 12, l. 10-22];

comparing the analyzed data points for each sub-group to the analyzed data points of every other selected sub-group [p. 13, l. 1-8];

determining from the comparison if compression is present [p. 13, 9-16]; and

generating a signal indicating compression in the digital quadrature amplitude modulated signal if the determining step indicates compression is present [p. 13, l. 17-21].

42. The method of Claim 41 wherein the selecting step selects more than one cell of the constellation [p. 12, l. 3-9].

43. The method of Claim 41 wherein the analyzing step averages a coordinate of each datum point according to its sub-group [p. 13, l. 4-5].

44. The method of Claim 43 wherein the averaging is according to each selected cell of the constellation [p. 13, l. 4-5].

45. The method of Claim 42 wherein the selected cells constitute a row of the constellation [p. 13, l. 1-5].

46. The method of Claim 45 wherein the selected cells constitute the top row of the constellation [p. 13, l. 2-3].

47. The method of Claim 45 wherein the selected cells constitute the bottom row of the constellation [p. 13, l. 2-3].

48. The method of Claim 45 wherein the selected cells constitute a column of the constellation [p. 13, l. 12-13].

49. The method of Claim 45 wherein the comparing step evaluates the inequalities [p. 13, l. 5-16]:

$$Y_{avg}[b_4] < Y_{avg}[b_3] < Y_{avg}[b_2] < Y_{avg}[b_1]$$

and

$$Y_{avg}[b_{-4}] < Y_{avg}[b_{-3}] < Y_{avg}[b_{-2}] < Y_{avg}[b_{-1}]$$

50. A method for detecting non-coherent interference in a digital quadrature amplitude modulated signal, the method comprising the steps of:

sorting the symbols of the digital quadrature amplitude modulated signal into a constellation [p. 9, l. 16-20; p. 10, l. 3-8];

detecting an error signal for one or more data points of the constellation [p. 14, l. 4-10];

arranging the detected error signals [p. 14, l. 11-17];

detecting non-coherent interference from the arranged, detected error signals [p. 15, l. 8-16]; and

generating a signal indicating non-coherent interference in the digital quadrature amplitude modulated signal if the detecting step indicates compression is present [p. 15, l. 16-17].

51. The method of Claim 50 wherein:

the sorting step includes sorting data points into cells of the constellation [p. 9, l. 16-20; p. 10, l. 3-8]; and

the detecting an error signal step includes determining the Euclidian distance between a datum point and the ideal point associated with the datum point's cell [p. 14, l. 8-10].

52. The method of Claim 51 wherein the arranging step includes constructing a histogram according to the error signals detected in the detecting step [p. 14, l. 11-17].

53. The method of Claim 52 wherein the step of detecting non-coherent interference from the arranged, detected error signals includes detecting one or more peaks in the histogram that are indicative of non-coherent interference [p. 15, l. 8-17].

54. A device for detecting impairments in a digital quadrature amplitude modulated signal comprising:

means for detecting phase noise [700] [p. 10, l. 1-2] comprising;

means for sorting one or more digital quadrature amplitude modulated signal symbols [1000] [p. 9, l. 16-20; p. 10, l. 3-8];

means for rotating data points such rotating means coupled to the sorting means[804] [p. 10, l. 9, thru p. 10, l. 8]; and

means for comparing rotated data points such comparing means coupled to the rotating means [802] [p. 11, l. 9-24];

means for detecting compression [702] [p. 25, l. 25, thru p. 26, l. 2];

means for detecting interference [704] [p. 13, l. 22-26]; and

means for storing a constellation storage [706] [p. 9, l. 15-20] such storage means coupled to the phase noise detection means [700] [p. 10, l. 1-2], the compression detection means [702] [p. 25, l. 25, thru p. 26, l. 2], and the interference detection means [704] [p. 13, l. 22-26].

55. (canceled)

56. The device of Claim 54 wherein the comparator [802] [p. 11, l. 9-24] means evaluates the inequality [p. 11, l. 15-20]:

$$\sigma_x >=_{[57]} C\sigma_y$$

57. The device of Claim 56 wherein C = 1.5 [902] [p. 11, l. 20].

58. The device of Claim 54 wherein the compression detection means [702] [p. 25, l. 25, thru p. 26, l. 2] comprises:

means for sorting one or more digital quadrature amplitude modulated signal symbols [800] [p. 10, l. 3-8]; and

means for determining X/Y deviations [902] [p. 12, l. 10-27] such means coupled to the sorting means [800] [p. 10, l. 3-8].

59. The device of Claim 58 wherein the X/Y deviation determining means evaluates the inequality [902] [p. 12, l. 19-23]:

$$Zavg <= CZ_{exp}$$

60. The device of Claim 59 wherein C = 0.98 [902] [p. 12, l. 22-23].

61. The device of Claim 58 wherein the X/Y deviation determining means analyzes a top row of cells of a constellation and evaluates the inequalities [902] [p. 13, l. 5-16]:

$$Y_{avg}[b_4] < Y_{avg}[b_3] < Y_{avg}[b_2] < Y_{avg}[b_1]$$

and

$$Y_{avg}[b_{-4}] < Y_{avg}[b_{-3}] < Y_{avg}[b_{-2}] < Y_{avg}[b_{-1}]$$

62. The device of Claim 54 wherein the interference detector [704] [p. 13, l. 22-26] comprises:

means for sorting one or more digital quadrature amplitude modulated signal symbols [800] [p. 9, l. 16-20; p. 10, l. 3-8];

means for detecting an error signal coupled to the sorting means [802] [p. 11, l. 5-6];

a distribution chart [1004] [p. 13, l. 22-26, and p. 14, l. 12-17] coupled to the error detection means; and

means for detecting peaks coupled to the distribution chart [1004] [p. 13, l. 22-26, and p. 14, l. 12-17].

Claims 63-69. (canceled)

70. A device for detecting impairments in a digital quadrature amplitude modulated signal comprising means for detecting interference wherein the interference detection means comprises:

means for sorting one or more digital quadrature amplitude modulated signal symbols [800] [p. 9, l. 16-20; p. 10, l. 3-8];

means for detecting an error signal coupled to the sorting means [802] [p. 11, l. 5-6];

a distribution chart [1004] [p. 13, l. 22-26, and p. 14, l. 12-17] coupled to the error detection means; and

means for detecting peaks coupled to the distribution chart [1004] [p. 13, l. 22-26, and p. 14, l. 12-17].

Claims 71-72. (canceled)

73. A device for detecting compression in a digital quadrature amplitude modulated signal comprising:

means for sorting the symbols of the digital quadrature amplitude modulated signal into a constellation [600] [p. 9, l. 16-20; p. 10, l. 3-8];

means for selecting a sub-group of data points from the constellation [800] [p. 10, l. 9-11];

means for determining the magnitude of the vectors from the origin of the constellation to each datum point of the sub-group [804] [p. 10, l. 11-12];

means for determining the magnitude of a vector from the origin to an ideal point associated with the sub-group [804] [p. 10. l. 13-14];

means for comparing the magnitude of the vectors from the origin of the constellation to each datum point to the magnitude of the vector from the origin to the ideal point associated with the sub-group [802] [p. 10, l. 11-14];

means for determining from the comparison if compression is present [902] [p. 12, l. 3-23]; and

means for generating a signal indicating compression in the digital quadrature amplitude modulated signal if the determining means indicates compression is present [902] [p. 12, l. 24-27].

74. The device of Claim 73 further comprising means for averaging the magnitudes of the vectors from the origin of the constellation to each datum point of the sub-group [902] [p. 12, l. 10-18].

75. The device of Claim 74 wherein the comparing means evaluates the inequality [902] [p. 12, l. 19-23]:

$Zavg <= CZ_{exp}$

76. A device for detecting compression in a digital quadrature amplitude modulated signal comprising:

means for sorting the symbols of the digital quadrature amplitude modulated signal into a constellation [800] [p. 9, l. 16-20; p. 10, l. 3-8];

means for selecting more than one sub-group of data points from the constellation [900] [p. 12, l. 3-9];

means for analyzing each datum point according to its selected sub-group [902] [p. 12, l. 10-22];

means for comparing the analyzed data points for each sub-group to the analyzed data points of every other selected sub-group [902] [p. 13, l. 1-8];

means for determining from the comparison if compression is present [902] [p. 13, 9-16]; and

means for generating a signal indicating compression in the digital quadrature amplitude modulated signal if the determining means indicates compression is present [902] [p. 13, l. 17-21].

77. The device of Claim 76 wherein the analyzing means averages a coordinate of each datum point according to its sub-group [902] [p. 13, l. 4-5].

78. The device of Claim 77 wherein the comparing means evaluates the inequalities [902] [p. 13, l. 5-16]:

$$Y_{avg}[b_4] < Y_{avg}[b_3] < Y_{avg}[b_2] < Y_{avg}[b_1]$$

and

$$Y_{avg}[b_{-4}] < Y_{avg}[b_{-3}] < Y_{avg}[b_{-2}] < Y_{avg}[b_{-1}]$$

79. A device for detecting non-coherent interference in a digital quadrature amplitude modulated signal comprising:

means for sorting the symbols of the digital quadrature amplitude modulated signal into a constellation [600] [p. 9, l. 16-20; p. 10, l. 3-8];

means for detecting an error signal for at least one datum point of the constellation [1000] [p. 14, l. 4-10];

means for arranging the detected error signals [1002] [p. 14, l. 11-17];

means for detecting non-coherent interference from the arranged, detected error signals [704] [p. 15, l. 8-16]; and

means for generating a signal indicating non-coherent interference in the digital quadrature amplitude modulated signal if the detection means indicates compression is present [1006] [p. 15, l. 16-17].

80. The device of Claim 79 wherein:

the sorting means includes means for sorting data points into cells of the constellation [800] [p. 9, l. 16-20; p. 10, l. 3-8]; and

the detection means includes means for determining the Euclidian distance between a datum point and the ideal point associated with the datum point's cell [1002] [p. 14, l. 8-10].

Claims 81-91 (canceled)

(6) Grounds for Rejection to be reviewed on appeal

Issue #1:

Whether Claims 1, 4, 18, and 54 are properly rejected under 35 U.S.C. §102(b) as being anticipated by Armstrong (U.S. Patent No. 4,381,546, hereinafter "Armstrong").

Issue #2:

Whether Claims 14, 62, and 70 are properly rejected under 35 U.S.C. §103(a) as being unpatentable over Armstrong (U.S. Patent No. 4,381,546, hereinafter "Armstrong").

(7) Arguments

Issue #1:

Claims 1, 4, 18, and 54 are improperly rejected under 35 U.S.C. §102(b) as being anticipated by Armstrong (U.S. Patent No. 4,381,546, hereinafter "Armstrong").

Armstrong discloses a system for measuring communication channel impairments in a data transmitting system, which employs quadrature amplitude modulation. The system rotates each point of sampled eye diagram information by a phase angle determined by the ideal value of the received point information so that the rotated point has its nominally maximum component on the real axis.

Regarding claims 1 and 54, Appellants respectfully traverse the rejections since the Appellants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Armstrong of:

"a phase noise detector comprising;"

The Examiner states in the Final Rejection of 10/30/07 (hereinafter the "Final Rejection"):

> "Armstrong teaches a device for detecting impairments in a digital quadrature amplitude modulated signal comprising:
> a phase noise detector (5C) comprising;" [underlining for clarity]

Appellants respectfully disagree because Armstrong FIG. 5C is labeled "PHASE JITTER" and merely shows a type of noise with no apparatus or phase noise detector.

Armstrong also discloses that line impairments are distinguished by statistical properties rather than apparatus for manipulating signals, as explained in Armstrong col. 4, lines 17-23:

> "Once the points are rotated from the X and Y axis to what has been defined as the C and D axis, line impairments may be readily distinguished from one another by means of statistical properties on the C and D axes. The line impairments of the rotated eye are depicted in FIGS. 5a-f wherein various impairments and combinations of impairments are depicted." [underlining for clarity]

The Examiner states in the Final Rejection "Response to Arguments":

> "Applicant argues that the Armstrong patent "does not show a phase noise detector but only an example of what Armstrong Fig.5A-F indicates are "IMPAIRMENTS WITH RESPECT TO ROTATED EYE." However, Fig. 6 clearly shows a calculating means outputting a noise, thus reading on the claimed phase noise detector." [underlining for clarity]

Appellants respectfully submit that Armstrong FIG. 6 shows the calculating means 18, which uses the computational algorithm in Armstrong FIGs. 9A through 9C, and therefore shows that the claimed phase noise detector would not read on the Armstrong calculating means.

It is also respectfully submitted that it would be obvious to one having ordinary skill in the art that the claimed "phase noise detector" comprising a "sorter", a "rotator", and a "comparator" does not read on the Armstrong "calculating means 18" performing statistical analysis as disclosed by Armstrong col. 4, lines 17-23:

> "Once the points are rotated from the X and Y axis to what has been defined as the C and D axis, line impairments may be readily distinguished from one another by means of statistical properties on the C and D axes. The line impairments of the rotated eye are depicted in FIGS. 5a-f wherein various impairments and combinations of impairments are depicted." [underlining for clarity]

Further, it is respectfully submitted that the phase noise detector detects phase noise and does not output noise.

Also regarding claims 1 and 54, Appellants respectfully traverse the rejections since the Appellants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Armstrong of:

> "[a phase noise detector comprising;]
> a sorter;" [insertion for clarity]

The Examiner states in the Final Rejection:

> "[a phase noise detector (5C) comprising;]
> a sorter (see col.3, lines 44-68);" [insertion and underlining for clarity]

Appellants respectfully disagree because Armstrong col. 3, lines 44-68, do not disclose a sorter but instead disclose a calculating means 18 with no sorting function because it states:

> "The calculating means provides several functions. It is capable of reading X and Y eye data from the receiver each baud time....
> ...the calculating means is capable of accumulating digital words which correspond to the values of the X and Y components of the eye." [deletions and underlining for clarity]

The Examiner also states in the Final Rejection "Response to Arguments":

> "Applicant argues that the Armstrong patent fails to disclose "a sorter," citing a description in the Armstrong patent regarding the calculating means However, the calculating means clearly teach reading X and Y eye data from the receiver each baud time. Since the claim fails to define the exact function of the sorter, the calculating means reads on the limitation because it reads sequentially, thus sorting the data." [underlining for clarity]

Appellants respectfully submit the underlined portion above clearly teaches that Armstrong does not sort the eye data but reads it in each baud time interval. Thus, those having ordinary skill in the art would not read the claimed sorter on the Armstrong calculating means because:

> "[C]laims . . . are to be given their broadest reasonable interpretation consistent with the specification, and . . . claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art." [deletions for clarity] *In re* Bond, 910 F.2d 831, 833 (Fed. Cir. 1990); accord Bass, 314 F.3d at 577

Also regarding claims 1 and 54, Appellants respectfully traverse the rejections since the Appellants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Armstrong of:

> "[a phase noise detector comprising;]
> a rotator coupled to the sorter;" [insertion for clarity]

The Examiner states in the Final Rejection:

> "[a phase noise detector (5C) comprising;]
> a rotator coupled to the sorter (see col.4, lines 5-6);" [insertion and underlining for clarity]

Appellants respectfully disagree because a rotator is not coupled to a sorter in Armstrong but instead Armstrong receives a signal that is rotated by a receiver to have a maximum component on a real axis, as disclosed col. 4, lines 1-16, which states:

> "In FIG. 2b there is depicted a representative 4 point signal constellation or eye diagram typical of the type obtained at the receiver... each point of the eye diagram is rotated as shown in FIG. 4. ... That is, each point is rotated by an ideal phase angle determined by the ideal value of the received point and selected so that the rotated point has its nominally maximum component on the real axis."[underlining and deletions for clarity]

The Examiner also states in the Final Rejection "Response to Arguments":

> "Regarding "a rotator," see the Abstract describing the rotation of sampled eye diagram information."

Appellants respectfully submit the detailed explanation above in col. 4, lines 18-21, clarifies the Armstrong Abstract and explains why the claimed rotator does not read on subject matter in the Armstrong Abstract.

Also regarding claims 1 and 54, Appellants respectfully traverse the rejections since the Appellants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Armstrong of:

> "[a phase noise detector comprising;]
> a comparator coupled to the rotator;" [insertion for clarity]

The Examiner states in the Final Rejection:

> "[a phase noise detector (5C) comprising;]
> a comparator (see col. 4, line 18-21) coupled to the rotator;"
> [insertion and underlining for clarity]

Appellants respectfully disagree because a comparator is not coupled to a rotator in Armstrong but instead Armstrong performs a statistical analysis on the rotated signal from the receiver as disclosed col. 4, lines 18-21, which states:

> "Once the points are rotated..., line impairments may be readily distinguished from one another by means of statistical properties..."[underlining and deletions for clarity]

The Examiner also states in the Final Rejection "Response to Arguments":

> "Regarding "a comparator," the statistical properties can be obtained by comparing the rotated sampling points to the ideal sampling points."

Appellants respectfully submit Armstrong FIGs 9A through 9C show how the statistical properties are obtained and that they are not obtained by comparing the rotated sampling points to the ideal sampling points.

Also regarding claims 1 and 54, Appellants respectfully traverse the rejections since the Appellants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Armstrong of:

"a compression detector;"

The Examiner states in the Final Rejection:

> "Armstrong teaches a device for detecting impairments in a digital quadrature amplitude modulated signal comprising:
> a compression detector (5A);" [underlining for clarity]

Appellants respectfully disagree because Armstrong FIG. 5A is labeled "FREQUENCY OFFSET" and does not disclose a compression detector. Those having ordinary skill in the art would be unable to determine how a compression detector could read on frequency offset.

The Examiner also states in the Final Rejection "Response to Arguments":

> "Regarding "a compression detector," applicant fails to distinguish between the (frequency) compression and the frequency offset."

Assuming *arguendo* that Appellants' claimed compression detector reads on frequency compression, it is respectfully submitted that those having ordinary skill in the art would recognize that frequency compression could not read on frequency offset.

It is also respectfully submitted that the Examiner has not established a *prima facie* case of anticipation of showing that frequency compression would read on frequency offset. The burden is therefore not on the Appellant to provide evidence, but rather on the Examiner, because:

> "It is by now well settled that the burden of establishing a *prima facie* case of anticipation resides with the Patent and Trademark Office." *Ex parte* Skinner, 2 USPQ2d 1788, 1788-89 (B.P.A.I. 1986).

Also regarding claims 1 and 54, Appellants respectfully traverse the rejections since the Appellants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Armstrong of:

"an interference detector;"

The Examiner states in the Final Rejection:

"Armstrong teaches a device for detecting impairments in a digital quadrature amplitude modulated signal comprising:

an interference detector (5B);" [underlining for clarity]

Appellants respectfully disagree because Armstrong FIG. 5B is labeled "NOISE" and does not disclose an interference detector. The claimed interference detector as defined in the Specification page 13, lines 23-25, "comprises a sorter 1000, an error calculator 1002, a distribution chart 1004, and a data peak detector 1006." Those having ordinary skill in the art would be unable to determine how an interference detector could read on noise.

The Examiner also states in the Final Rejection "Response to Arguments":

"Regarding "an interference detector," the noise is also considered as interference."

Appellants respectfully submit that the claimed limitation is to "an interference detector" and that the Appellants do not claim "noise" or "interference".

Also regarding claims 1 and 54, Appellants respectfully traverse the rejections since the Appellants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Armstrong of:

"a constellation storage coupled to the phase noise detector, the compression detector, and the interference detector."

The Examiner states in the Final Rejection:

"Armstrong teaches a device for detecting impairments in a digital quadrature amplitude modulated signal comprising:

a constellation storage coupled to the phase noise detector, the compression detector, and the interference detector. Although the constellation storage is not shown its presence is easily inferred because in order to compare the rotated signal points to the ideal signal points, "a constellation storage" must be

> present to prestore the ideal signal points such as shown in Fig.3A." [underlining for clarity]

Appellants respectfully disagree because there is no disclosure in Armstrong that a comparison of rotated signal points to the ideal signal points occurs. Instead, Armstrong states in col. 4, lines 18-21, repeated below, that after points are rotated, line impairments are distinguished by statistical properties:

> "Once the points are rotated from the X and Y axis to what has been defined as the C and D axis, line impairments may be readily distinguished from one another by means of statistical properties on the C and D axes." [underlining for clarity]

Since the statistical properties are determined using the computational algorithm disclosed in Armstrong FIGs. 9A through 9C, the Examiner's position regarding the above must be based on the Examiner's personal knowledge because there is no disclosure in Armstrong to support the Examiner's position regarding a comparison. Appellants respectfully requested an Examiner Affidavit disclosing the Examiner's personal knowledge regarding this limitation pursuant to 37 CFR §1.104(d)(2):

> "When a rejection in an application is based on facts within the personal knowledge of an employee of the Office, the data shall be as specific as possible and the reference must be supported, when called for by the applicant, by the affidavit of such employee, and such affidavit shall be subject to contradiction or explanation by the affidavits of the applicant and other persons."

By failing to provide the timely requested Examiner Affidavit, the Examiner has failed to establish a *prima facie* case of anticipation because:

> "As adapted to *ex parte* procedure, Graham [v. John Deere Co.] is interpreted as continuing to place the 'burden of proof on the Patent Office which requires it to produce the factual basis for its rejection of an application under sections 102 and 103.'" [insertion and underlining for clarity] *In re* Piasecki, 745 F.2d 1468, 223 USPQ 785, 788 (Fed. Cir. 1984), quoting *In re* Warner, 379 F.2d 1011, 154 USPQ 173, 177 (C.C.P.A. 1967), *cert. denied*, 389 U.S. 1057 (1968).

Appellants also respectfully disagree because Armstrong FIG. 3A is labeled "Eye Diagram with Gaussian Noise" and does not disclose ideal signal points or prestoring ideal signal points. What actually is shown in Armstrong FIG. 3A in Armstrong is fully disclosed in Armstrong col. 1, lines 42-52, which discusses FIG. 3A and states:

> "Degradation of the communication channel manifests itself on the eye diagram in relatively well defined modes, the more common of which are depicted in FIGS. 3A-3D... Thus, if the communication medium is degraded by gaussian noise, the small clearly defined dots of the receiver eye diagram...would enlarge to roughly circular areas as a result of the noise having been added to the data signal. This is shown in FIG. 3A wherein the diameter of the circular areas is a measure of the noise." [underlining and deletions for clarity]

Based on the above, it is respectfully submitted that claims 1 and 54 are allowable under 35 U.S.C. §102(b) as not being anticipated by Armstrong because:

> "Anticipation requires the disclosure in a single prior art reference disclosure of each and every element of the claim under consideration." W.L. Gore & Assocs. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983) (citing Soundscriber Corp. v. United States, 360 F.2d 954, 960, 148 USPQ 298, 301 (Ct. Cl.), *adopted*, 149 USPQ 640 (Ct. Cl. 1966)), *cert. denied*, 469 U.S. 851 (1984). Carella v. Starlight Archery, 804 F.2d 135, 138, 231 USPQ 644, 646 (Fed. Cir.), *modified on reh'g*, 1 USPQ 2d 1209 (Fed. Cir. 1986); RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984).

Regarding claims 4 and 18, Appellants respectfully traverse the rejections since the Appellants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Armstrong of:

"the rotator rotates a vector utilizing the matrix:

$$\begin{vmatrix} \cos\Theta & \sin\Theta \\ -\sin\Theta & \cos\Theta \end{vmatrix}$$

The Examiner states in the Final Rejection:

> "See col. 4, lines 7-13 for the recited vector. Specifically, a vector utilizing a matrix of (1-j1), -1-j1, -1+j1 and 1+j1), which are in fact cosine and sine matrix is multiplied to received signal points."

Appellants respectfully disagree because Armstrong does not disclose a rotator rotating a vector using a matrix but a receiver rotating a point by an ideal phase angle, as stated in Armstrong col. 4, lines 7-13:

> "If a receiver point is determined to be in quadrant 1, its complex value (X+jY) is multiplied by (1-j1) to yield (X+Y+jY-jX). This would reduce to (2+j0) if X and Y both equal 1. Similarly, points in quadrants II, III and IV would be multiplied respectively by (-1-j1), (-1+j1), and (1+j1) to obtain the desired rotation of the present invention. That is, each point is rotated by an ideal phase angle determined by the ideal value of the received point and selected so that the rotated point has its nominally maximum component on the real axis." [underlining for clarity]

The Examiner repeats the rejection verbatim in the Final Rejection "Response to Arguments" and this has already been addressed above.

Based on the above, it is respectfully submitted that claims 4 and 18 are allowable under 35 U.S.C. §102(b) as not being anticipated by Armstrong because:

> "Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, *arranged as in the claim*." [*emphasis added*] Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co. (730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984)(citing Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 220 USPQ 193 (Fed Dir. 1983))).

Regarding claims 3-14 and 56-62, these dependent claims respectively depend from independent claim 1 and 54, and are believed to be allowable since they contain all the limitations set forth in the independent claim from which they depend and claim additional unobvious combinations thereof.

Issue #2:

Claims 14, 62, and 70 are improperly rejected under 35 U.S.C. §103(a) as being unpatentable over Armstrong (U.S. Patent No. 4,381,546, hereinafter "Armstrong").

Armstrong has been summarized above.

Regarding claims 14, 62, and 70, the Examiner states:

> "Armstrong fails to teach that the interference detector (Fig.5A) comprises an error calculator, a distribution chart and a data peak detector. But Armstrong teaches comparing statistical properties of constellations and an error calculator, a distribution chart and a data peak detector would have been obviously included in the interference detector since these are well known parameters used in statistical analysis." [underlining for clarity]

Appellants respectfully submit that Armstrong FIGs. 9A through 9C teach the computational algorithm used in determining the statistical properties and the Armstrong computational algorithm does not teach or suggest an error calculator, a distribution chart, or a data peak detector.

Further regarding independent claim 70, it is respectfully submitted that the claim is allowable for the same reasons as claim 1.

Based on the above, it is respectfully submitted that claims 14, 62, and 70 are allowable under 35 U.S.C. §103(a) as being patentable over Armstrong because:

> "[T]he prior art reference (or references when combined) must teach or suggest **all** the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." [Bold for clarity] *In re* Vaeck, 947 F2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

Withdrawal of the rejections is respectfully requested.

(8) Claims Appendix

See Appendix I

(9) EvidenceAappendix

See Appendix II

(10) Related Proceedings Appendix

See Appendix III

Conclusion and Relief Requested:

Claims 1, 3-14, 18, 54, 56-62, and 70 are patentable over the prior art.

Reversal of the Examiner's rejections is respectfully requested.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including any extension of time fees, to Deposit Account No. 50-0374 and please credit any excess fees to such deposit account.

Respectfully submitted,

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APPENDICES follow on separate pages

I hereby certify that this correspondence is being electronically transmitted to the USPTO via EFS from the Pacific Time zone on December 28, 2007

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December 28, 2007

(8) Claims appendix

Appendix I – Claims on Appeal

1. A device for detecting impairments in a digital quadrature amplitude modulated signal comprising:

a phase noise detector comprising;

a sorter;

a rotator coupled to the sorter; and

a comparator coupled to the rotator;

a compression detector;

an interference detector; and

a constellation storage coupled to the phase noise detector, the compression detector, and the interference detector.

2. (canceled)

3. The device of Claim 1 wherein the rotator rotates a vector utilizing a method comprising the steps of:

converting the vector's end point coordinates into polar coordinates;

adjusting the angle coordinate; and

reconverting the end point coordinates to Cartesian coordinates.

4. The device of Claim 1 wherein the rotator rotates a vector utilizing the matrix:

$$\begin{vmatrix} \cos\Theta & \sin\Theta \\ -\sin\Theta & \cos\Theta \end{vmatrix}$$

5. The device of Claim 1 wherein the comparator evaluates the inequality:

$$\sigma_x >= C\sigma_y$$

6. The device of Claim 5 wherein C = 1.5.

7. The device of Claim 1 wherein the compression detector comprises:

a sorter; and

an X/Y deviation determinator coupled to the sorter.

8. The device of Claim 1:

wherein the phase noise detector comprises:

a rotator; and

a comparator coupled to the rotator;

wherein the compression detector comprises an X/Y deviation determinator; and

wherein the phase noise detector and compression detector share a sorter coupled to the rotator and to the X/Y deviation determinator.

9. The device of Claim 7 wherein the X/Y deviation determinator evaluates the inequality:

$$Z_{avg} <= CZ_{exp}$$

10. The device of Claim 9 wherein $C = 0.98$.

11. The device of Claim 7 wherein the X/Y deviation determinator analyzes a top row of cells of a constellation.

12. The device of Claim 11 wherein the X/Y deviation determinator evaluates the inequalities:

$$Y_{avg}[b_4] < Y_{avg}[b_3] < Y_{avg}[b_2] < Y_{avg}[b_1]$$

and

$$Y_{avg}[b_{-4}] < Y_{avg}[b_{-3}] < Y_{avg}[b_{-2}] < Y_{avg}[b_{-1}]$$

13. The device of Claim 7 wherein the X/Y deviation determinator analyzes a column of cells of a constellation.

14. The device of Claim 1 wherein the interference detector [704] comprises:

a sorter;

an error calculator [1002] [p. 13, l. 22, thru p. 14, l. 12]coupled to the sorter;

a distribution chart coupled to the error calculator; and

a data peak detector coupled to the distribution chart.

Claims 15-16 (canceled)

17. A device for detecting impairments in a digital quadrature amplitude modulated signal comprising a phase noise detector, wherein the phase noise detector comprises:

a sorter;

a rotator coupled to the sorter wherein the rotator rotates a vector by utilizing a method comprising the steps of:

converting the end point coordinates into polar coordinates;

adjusting the angle coordinate; and

reconverting the end point coordinates to Cartesian coordinates; and

a comparator coupled to the rotator

18. A device for detecting impairments in a digital quadrature amplitude modulated signal comprising a phase noise detector, wherein the phase noise detector comprises:

a sorter;

a rotator coupled to the sorter; and

a comparator coupled to the rotator wherein the rotator rotates a vector utilizing the matrix:

$$\begin{vmatrix} \cos\Theta & \sin\Theta \\ -\sin\Theta & \cos\Theta \end{vmatrix}$$

19. A device for detecting impairments in a digital quadrature amplitude modulated signal comprising a phase noise detector:

wherein the phase noise detector comprises:

a rotator; and

a comparator coupled to the rotator;

wherein the compression detector comprises an X/Y deviation determinator;

wherein the interference detector comprises:

an error calculator;

a distribution chart;

a data peak detector; and

wherein the phase noise detector, compression detector, and interference detector share a sorter coupled to the rotator, to the X/Y deviation determinator, and to the error calculator.

Claims 20-32. (canceled)

33. A method for detecting compression in a digital quadrature amplitude modulated signal, the method comprising the steps of:

sorting the symbols of the digital quadrature amplitude modulated signal into a constellation;

selecting a sub-group of data points from the constellation;

determining the magnitude of the vectors from the origin of the constellation to each datum point of the sub-group;

determining the magnitude of a vector from the origin to an ideal point associated with the sub-group;

comparing the magnitude of the vectors from the origin of the constellation to each datum point to the magnitude of the vector from the origin to the ideal point associated with the sub-group;

determining from the comparison if compression is present; and

generating a signal indicating compression in the digital quadrature amplitude modulated signal if the determining step indicates compression is present.

34. The method of Claim 33 wherein the sub-group is a cell of the constellation.

35. The method of Claim 33 wherein the sub-group is a cell in a corner of the constellation.

36. The method of Claim 33 further comprising the step of averaging the magnitudes of the vectors from the origin of the constellation to each datum point of the sub-group.

37. The method of Claim 34 further comprising the step of averaging the magnitudes of the vectors from the origin of the constellation to each datum point of the sub-group.

38. The method of Claim 35 further comprising the step of averaging the magnitudes of the vectors from the origin of the constellation to each datum point of the sub-group.

39. The method of Claim 36 wherein the comparing step evaluates the inequality:

$$Z_{avg} <= CZ_{exp}$$

40. The method of Claim 39 wherein C = 0.98.

41. A method for detecting compression in a digital quadrature amplitude modulated signal, the method comprising the steps of:

sorting the symbols of the digital quadrature amplitude modulated signal into a constellation;

selecting more than one sub-group of data points from the constellation;

analyzing each datum point according to its selected sub-group;

comparing the analyzed data points for each sub-group to the analyzed data points of every other selected sub-group;

determining from the comparison if compression is present; and

generating a signal indicating compression in the digital quadrature amplitude modulated signal if the determining step indicates compression is present.

42. The method of Claim 41 wherein the selecting step selects more than one cell of the constellation.

43. The method of Claim 41 wherein the analyzing step averages a coordinate of each datum point according to its sub-group.

44. The method of Claim 43 wherein the averaging is according to each selected cell of the cons

45. The method of Claim 42 wherein the selected cells constitute a row of the constellation.

46. The method of Claim 45 wherein the selected cells constitute the top row of the constellation.

47. The method of Claim 45 wherein the selected cells constitute the bottom row of the constellation.

48. The method of Claim 45 wherein the selected cells constitute a column of the constellation.

49. The method of Claim 45 wherein the comparing step evaluates the inequalities:

$$Y_{avg}[b_4] < Y_{avg}[b_3] < Y_{avg}[b_2] < Y_{avg}[b_1]$$

and

$$Y_{avg}[b_{-4}] < Y_{avg}[b_{-3}] < Y_{avg}[b_{-2}] < Y_{avg}[b_{-1}]$$

50. A method for detecting non-coherent interference in a digital quadrature amplitude modulated signal, the method comprising the steps of:

sorting the symbols of the digital quadrature amplitude modulated signal into a constellation;

detecting an error signal for one or more data points of the constellation;

arranging the detected error signals;

detecting non-coherent interference from the arranged, detected error signals; and

generating a signal indicating non-coherent interference in the digital quadrature amplitude modulated signal if the detecting step indicates compression is present.

51. The method of Claim 50 wherein:

the sorting step includes sorting data points into cells of the constellation; and

the detecting an error signal step includes determining the Euclidian distance between a datum point and the ideal point associated with the datum point's cell.

52. The method of Claim 51 wherein the arranging step includes constructing a histogram according to the error signals detected in the detecting step.

53. The method of Claim 52 wherein the step of detecting non-coherent interference from the arranged, detected error signals includes detecting one or more peaks in the histogram that are indicative of non-coherent interference.

54. A device for detecting impairments in a digital quadrature amplitude modulated signal comprising:

means for detecting phase noise comprising;

means for sorting one or more digital quadrature amplitude modulated signal symbols;

means for rotating data points such rotating means coupled to the sorting means; and

means for comparing rotated data points such comparing means coupled to the rotating means;

means for detecting compression;

means for detecting interference; and

means for storing a constellation storage such storage means coupled to the phase noise detection means, the compression detection means, and the interference detection means.

55. (canceled)

56. The device of Claim 54 wherein the comparator means evaluates the inequality:

$$\sigma_x >= C\sigma_y$$

57. The device of Claim 56 wherein C = 1.5.

58. The device of Claim 54 wherein the compression detection means comprises:

means for sorting one or more digital quadrature amplitude modulated signal symbols; and

means for determining X/Y deviations such means coupled to the sorting means.

59. The device of Claim 58 wherein the X/Y deviation determining means evaluates the inequality:

$$Z_{avg} <= CZ_{exp}$$

60. The device of Claim 59 wherein C = 0.98.

61. The device of Claim 58 wherein the X/Y deviation determining means analyzes a top row of cells of a constellation and evaluates the inequalities:

$$Y_{avg}[b_4] < Y_{avg}[b_3] < Y_{avg}[b_2] < Y_{avg}[b_1]$$

and

$$Y_{avg}[b_{-4}] < Y_{avg}[b_{-3}] < Y_{avg}[b_{-2}] < Y_{avg}[b_{-1}]$$

62. The device of Claim 54 wherein the interference detector comprises:

means for sorting one or more digital quadrature amplitude modulated signal symbols;

means for detecting an error signal coupled to the sorting means;

a distribution chart coupled to the error detection means; and

means for detecting peaks coupled to the distribution chart.

Claims 63-69. (canceled)

70. A device for detecting impairments in a digital quadrature amplitude modulated signal comprising means for detecting interference wherein the interference detection means comprises:

means for sorting one or more digital quadrature amplitude modulated signal symbols;

means for detecting an error signal coupled to the sorting means;

a distribution chart coupled to the error detection means; and

means for detecting peaks coupled to the distribution chart.

Claims 71-72. (canceled)

73. A device for detecting compression in a digital quadrature amplitude modulated signal comprising:

means for sorting the symbols of the digital quadrature amplitude modulated signal into a constellation;

means for selecting a sub-group of data points from the constellation;

means for determining the magnitude of the vectors from the origin of the constellation to each datum point of the sub-group;

means for determining the magnitude of a vector from the origin to an ideal point associated with the sub-group;

means for comparing the magnitude of the vectors from the origin of the constellation to each datum point to the magnitude of the vector from the origin to the ideal point associated with the sub-group;

means for determining from the comparison if compression is present; and

means for generating a signal indicating compression in the digital quadrature amplitude modulated signal if the determining means indicates compression is present.

74. The device of Claim 73 further comprising means for averaging the magnitudes of the vectors from the origin of the constellation to each datum point of the sub-group.

75. The device of Claim 74 wherein the comparing means evaluates the inequality:

$$Z_{avg} <= CZ_{exp}$$

76. A device for detecting compression in a digital quadrature amplitude modulated signal comprising:

means for sorting the symbols of the digital quadrature amplitude modulated signal into a constellation;

means for selecting more than one sub-group of data points from the constellation;

means for analyzing each datum point according to its selected sub-group;

means for comparing the analyzed data points for each sub-group to the analyzed data points of every other selected sub-group;

means for determining from the comparison if compression is present; and

means for generating a signal indicating compression in the digital quadrature amplitude modulated signal if the determining means indicates compression is present.

77. The device of Claim 76 wherein the analyzing means averages a coordinate of each datum point according to its sub-group.

78. The device of Claim 77 wherein the comparing means evaluates the inequalities:

$$Y_{avg}[b_4] < Y_{avg}[b_3] < Y_{avg}[b_2] < Y_{avg}[b_1]$$

and

$$Y_{avg}[b_{-4}] < Y_{avg}[b_{-3}] < Y_{avg}[b_{-2}] < Y_{avg}[b_{-1}]$$

79. A device for detecting non-coherent interference in a digital quadrature amplitude modulated signal comprising:

means for sorting the symbols of the digital quadrature amplitude modulated signal into a constellation;

means for detecting an error signal for at least one datum point of the constellation;

means for arranging the detected error signals;

means for detecting non-coherent interference from the arranged, detected error signals; and

means for generating a signal indicating non-coherent interference in the digital quadrature amplitude modulated signal if the detection means indicates compression is present.

80. The device of Claim 79 wherein:

the sorting means includes means for sorting data points into cells of the constellation; and

the detection means includes means for determining the Euclidian distance between a datum point and the ideal point associated with the datum point's cell.

Claims 81-91 (canceled)

(9) Evidence appendix

Appendix *II*

Evidence under 37 CFR 1.130, 1.131, or 1.132 entered by examiner and relied upon by appellant or any other evidence entered by the examiner and relied upon by appellant in the appeal, along with a statement setting forth where in the record that evidence was entered by the examiner

(37 CFR 41.37(c)(1)(ix)

None

(10) Related Proceedings appendix

APPENDIX III

Decisions rendered by a court or the Board identified in
Related Appeals and Interferences section

(37 CFR 41.37(c)(1)(x)

Copies of the following decisions are herein enclosed:

None